SEMESTER EXAMINATION,APRIL-MAY, 2025

Course Name: - B.tech(ECE) **Semester:- 4th**

Paper Name: - Design&Analysis of Algorithm **PaperCode:-TES-401**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Additional 30 Minutes for Mid-Test.

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark**. **All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- SectionC- Answer any **2 out of 3** given questions. Each question carries **10 marks**
- Section D- Each question carries **02 mark**. All questions are compulsory.

Section – A (खण्ड–अ)

Objective Questions (वस्तुनिष्ठप्रश्न)

1. Answer allthe following questions. **5x3 =15**

i) The time factor when determining the efficiency of algorithm is measured by?
a) Counting microseconds
b) Counting the numbers of key operations
c) Counting the numbers of operations
d) None of the above

ii) What is the value of the postfix expression 6 3 2 4 + - * ?
a) *74*
b) *-18*
c) *22*
d) *80*

iii) *Dijkastra's algorithm bears some similarity to*
a) *BFS*
b) *Prim's algorithm*
c) *DFS*
d) Both a&b

iv) The concept of order Big O is important because
a) It can be used to decide the best algorithm that solves a given problem
b) It determines the maximum size of a problem that can be solved in a given amount of time.
c) It is the lower bound of the growth rate of algorithm .
d) Both A and B

v) Breadth first search_____
a) Scan each incident node along with its children.
b) Scans all incident edges before moving the other node.
c) Issame as backtracking
d) Scans all the nodes in random order.

Section – B (खण्ड–ब)

Short Answer Questions (लघुउत्तरीय प्रश्न)

2. Answer any five of the following questions. **5x7=35**

I. Explain Knapsack problem (0/1) using Greedy approach. {P1,P2,P3}={25,24,15}
{w1,w2,w3}={18,15,10} and capacity of bag is 20.

II. Write short note on:

a) Branch and Bound technique b) Brute force algorithm

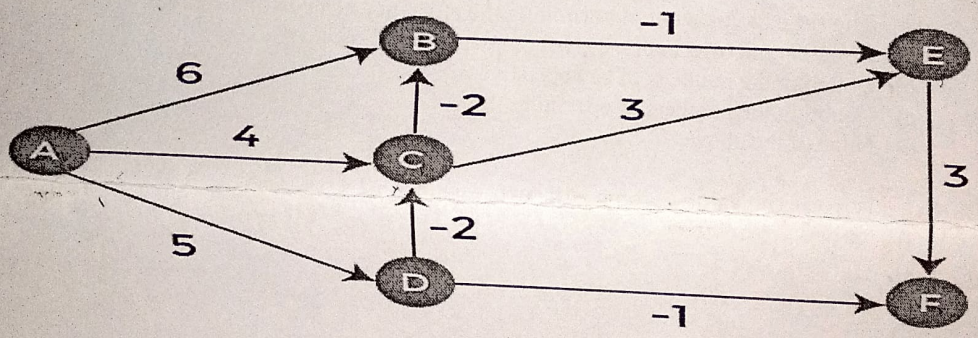
III. Differentiate between Greedy approach,Dynamic Programming and divide&conquer.

IV. Differentiate between DFS and BFS with the help of Graph traversals examples.

V. Find the time complexity using master theorem.
a. T(n) =9T(n/3)+n b.T(n)=T(n/3)+1

VI. Explain Asymptotic notations in detail with the help of examples.

VII. Write Bellman Ford algorithm with the help of example.



Section -C

Descriptive Questions(विवरणात्मकप्रश्न)

3. Answer any two of the following question **2x10=20**

i) Write a short note on:
a) NP hard b) NP-Completeness c) np problem d) p

ii) Explain Randomized algorithm using Las Vegas and Monte Carlo algorithm and also write their applications.

iii) Explain TSP problem using Branch and Bound technique with the help of example.

Section-D
MID SEM EXAM

4. Answer all the following questions. 10x2 =20
निम्नलिखित सभी प्रश्न अनिवार्य हैं।

(i) Fractional knapsack problem is solved most efficiently by which of the following?
a.Backtracking
b.Greedy approach
c.Dynamic Programming
d. none of the above

(ii) If f(n)=T(n/2)+C then time complexity is ?
a. o(n/2)
b.o(1)
c. o(n)
d.o(log n)

(iii) Which data structure is required to convert the infix to prefix notation?
a. Queue
b. Linked list
c. Stack
d. Binary tree

(iv) Study the following program:

```
#include <stdio.h>
  int main()
 {
 int arr[6]={8,9,7,5,2,1};
 printf("%d",arr[6]);

     return 0;
    }
```

a. 1
b. Garbage value
c. 8
d.None of the these

(v) An algorithm is_____?
a. a problem
b. a procedure for solving a problem
c. a mathematical problem
d. none of the above

(vi) The worst case complexity of Quick sort is --
a. O(1)
b. $O(n^2)$
c. O(logn)
d. O(nlogn)

(vii) Which sort is not stable sorting?
a. Quick sort
b. Merge sort
c. Bubble Sort
d. Insertion Sort

(viii) The Space complexity in worst case of Merge Sort:

a. O(n)
b. $O(n^2)$
c. O(logn)
d. O(nlogn)

(ix) Sorting is not possible by using which of the following methods?

a. Insertion
b. Selection
c. Deletion
d. Exchange

(x) The worst case complexity of the non deterministic dynamic knapsack algorithm is ?

a. O(nlogn)
b. O(log n)
c. O(1)
d. O(n)

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